

Claims

1. An elongated guide wire for use in a surgical or other procedure for accessing a remote site in the body of a human or animal subject, the guide wire defining a longitudinally extending central axis, and extending axially between a distal end for accessing the remote site, and a spaced apart proximal end, a distal portion of the guide wire adjacent the distal end thereof being of substantially rectangular transverse cross-section defining a pair of spaced apart major surfaces, and a pair of spaced apart minor surfaces extending between the major surfaces, the distal portion further defining a central major plane lying intermediate the major surfaces and bisecting the minor surfaces, and a central minor plane lying intermediate the minor surfaces and bisecting the major surfaces, characterised in that the distal portion is bent into a curved configuration in the central major plane for forming an alignment portion lying in the central major plane and extending from the bend at an angle greater than zero relative to the central axis for facilitating guiding of the guide wire into a branched vessel of the subject.
2. A guide wire as claimed in Claim 1 characterised in that the alignment portion extends relative to the central axis at an angle up to 90°.
3. A guide wire as claimed in Claim 2 characterised in that the alignment portion extends relative to the central axis at an angle up to 60°.
4. A guide wire as claimed in Claim 3 characterised in that the alignment portion extends relative to the central axis at an angle up to 45°.
5. A guide wire as claimed in Claim 4 characterised in that the alignment portion extends relative to the central axis at an angle up to 30°.
6. A guide wire as claimed in Claim 1 or 2 characterised in that the alignment portion extends relative to the central axis at an angle in the range of 30° to 90°.
7. A guide wire as claimed in any preceding claim characterised in that the

distal portion of the guide wire is of a material for retaining the distal portion in the curved configuration formed by the bend.

8. A guide wire as claimed in any preceding claim characterised in that the
5 distal portion of the guide wire is of dimensions for retaining the distal portion in the curved configuration formed by the bend.

9. A guide wire as claimed in any preceding claim characterised in that the
10 distal portion of the guide wire is bendable in the central minor plane thereof for facilitating bending of the distal portion with at least a part of the alignment portion bent out of the central major plane for facilitating guiding of the guide wire into a branched vessel of the subject.

10. A guide wire as claimed in any preceding claim characterised in that the
15 distal portion of the guide wire is bendable in the central minor plane thereof for facilitating bending of the distal portion with the alignment portion bent out of the central major plane for facilitating guiding of the guide wire into a branched vessel of the subject.

20 11. A guide wire as claimed in Claim 9 or 10 characterised in that the distal portion of the guide wire is of material for facilitating manual bending of the distal portion in the central minor plane thereof.

12. A guide wire as claimed in any of Claims 9 to 11 characterised in that the
25 distal portion of the guide wire is dimensioned for facilitating manual bending of the distal portion in the central minor plane thereof.

13. A guide wire as claimed in any preceding claim characterised in that the
distal portion of the guide wire is of stainless steel material.

30 14. A guide wire as claimed in any preceding claim characterised in that the major surfaces of the distal portion of the guide wire converge towards the distal

end.

15. A guide wire as claimed in any preceding claim characterised in that the minor surfaces of the distal portion of the guide wire diverge towards the distal end.

5

16. A guide wire as claimed in any of Claims 1 to 14 characterised in that the minor surfaces of the distal portion of the guide wire are parallel to each other.

17. A guide wire as claimed in any preceding claim characterised in that a reinforcing means is provided on the distal portion of the guide wire for minimising bending of the distal portion in the central minor plane thereof.

10

18. A guide wire as claimed in Claim 17 characterised in that the reinforcing means extending along at least a portion of the distal portion of the guide wire from a proximal end of the distal portion.

15

19. A guide wire as claimed in Claim 17 or 18 characterised in that the reinforcing means extends along at least a part of the alignment portion.

20. A guide wire as claimed in any of Claims 17 to 19 characterised in that the reinforcing means terminates at a location spaced apart from the distal end of the alignment portion.

20

21. A guide wire as claimed in any of Claims 17 to 20 characterised in that the reinforcing means is located to coincide substantially with the central minor plane defined by the distal portion.

25

22. A guide wire as claimed in any of Claims 17 to 21 characterised in that the reinforcing means comprises an elongated reinforcing member extending along one of the major surfaces of the distal portion.

30

23. A guide wire as claimed in any preceding claim characterised in that the

guide wire comprises an elongated core wire extending from the proximal end to the distal portion.

24. A guide wire as claimed in Claim 23 characterised in that the core wire
5 terminates in the distal portion.

25. A guide wire as claimed in Claim 24 characterised in that the distal portion of the guide wire is integrally formed with the core wire.

10 26. A guide wire as claimed in Claim 24 or 25 characterised in that the distal portion of the guide wire is formed from the core wire.

27. A guide wire as claimed in Claim 24 characterised in that the distal portion of the guide wire is formed separately from the core wire, and is secured thereto.

15 28. A guide wire as claimed in any of Claims 23 to 27 characterised in that the distal portion of the guide wire terminates in a bulbous portion at the distal end of the guide wire for facilitating guiding of the guide wire through vessels of the subject without damaging the vessels.

20 29. A guide wire as claimed in Claim 28 characterised in that the bulbous portion is radiused.

25 30. A guide wire as claimed in Claim 28 or 29 characterised in that the bulbous portion defines the distal end of the guide wire and defines a hemispherical distal end.

31. A guide wire as claimed in any of Claims 28 to 30 characterised in that the guide wire comprises a sleeve extending from the bulbous portion in a proximal
30 direction and the core wire extends through the sleeve.

32. A guide wire as claimed in Claim 31 characterised in that the sleeve extends

along the core wire in the proximal direction beyond the distal portion of the guide wire.

33. A guide wire as claimed in Claim 31 or 32 characterised in that the sleeve
5 terminates at a location intermediate the distal portion and the proximal end of the guide wire.

34. A guide wire as claimed in any of Claims 31 to 33 characterised in that one
10 end of the sleeve is secured to the bulbous portion of the guide wire, and the other end of the sleeve is secured to the core wire.

35. A guide wire as claimed in any of Claims 31 to 34 characterised in that the sleeve is secured to the guide wire by soldering.

15 36. A guide wire as claimed in any of Claims 31 to 35 characterised in that the sleeve is of transverse cross-section, the outer periphery of which substantially coincides with the outer periphery defined by the transverse cross-section of the bulbous portion.

20 37. A guide wire as claimed in any of Claims 30 to 35 characterised in that the distal end of the sleeve is of a radiopaque material.

38. A guide wire as claimed in any of Claims 31 to 37 characterised in that the sleeve is of a radiopaque material.

25 39. A guide wire as claimed in any of Claims 31 to 38 characterised in that the sleeve is selected from one or more of the following metals:

platinum,
platinum alloy,
30 gold,
tantalum.

40. A guide wire as claimed in any of Claims 31 to 39 characterised in that the sleeve comprises a helically wound coil.

41. A guide wire as claimed in any of Claims 31 to 40 characterised in that the
5 sleeve comprises a tightly wound helical coil.

42. A guide wire as claimed in any of Claims 31 to 41 characterised in that the sleeve is of a plastics material.

10 43. A guide wire as claimed in any of Claims 31 to 42 characterised in that the sleeve is provided in at least two longitudinally extending sections, one of which is of plastics material, and the other of a tightly wound helical coil.

44. A guide wire as claimed in any preceding claim for use in accessing a remote
15 site in the body of a human or animal subject.

45. In combination a catheter for use in a surgical or other procedure for
accessing a remote site in the body of a human or animal subject, and an elongated
guide wire, characterised in that the elongated guide wire is a guide wire as claimed
20 in any preceding claim.

46. In combination a catheter for use in a surgical or other procedure for
accessing a remote site in the body of a human or animal subject, and an elongated
guide wire, the guide wire defining a longitudinally extending central axis, and
25 extending axially between a distal end for accessing the remote site, and a spaced
apart proximal end, a distal portion of the guide wire adjacent the distal end thereof
being of substantially rectangular transverse cross-section defining a pair of spaced
apart major surfaces, and a pair of spaced apart minor surfaces extending between
the major surfaces, the distal portion further defining a central major plane lying
30 intermediate the major surfaces and bisecting the minor surfaces, and a central
minor plane lying intermediate the minor surfaces and bisecting the major surfaces,
characterised in that the distal portion is bent into a curved configuration in the

central major plane for forming an alignment portion lying in the central major plane and extending from the bend at an angle greater than zero relative to the central axis for facilitating guiding of the guide wire into a branched vessel of the subject.

- 5 47. A method for forming an elongated guide wire for use in a surgical or other procedure for accessing a remote site in the body of a human or animal subject, the method comprising the steps of:

forming the distal portion of the guide wire of substantially rectangular transverse cross-section defining a pair of spaced apart major surfaces, and a pair of
10 spaced apart minor surfaces extending between the major surfaces, the distal portion further defining a central major plane lying intermediate the major surfaces and bisecting the minor surfaces, and a central minor plane lying intermediate the minor surfaces and bisecting the major surfaces, and

bending the distal portion into a curved configuration in the central major
15 plane for forming an alignment portion lying in the central major plane and extending from the bend at an angle greater than zero relative to the central axis for facilitating guiding of the guide wire into a branched vessel of the subject.

48. A method as claimed in Claim 47 characterised in that the alignment portion
20 extends relative to the central axis at an angle up to 90°.

49. A method as claimed in Claim 48 characterised in that the alignment portion extends relative to the central axis at an angle up to 60°.

- 25 50. A method as claimed in Claim 49 characterised in that the alignment portion extends relative to the central axis at an angle up to 45°.

51. A method as claimed in Claim 50 characterised in that the alignment portion extends relative to the central axis at an angle up to 30°.

30

52. A method as claimed in Claim 47 or 48 characterised in that the alignment portion extends relative to the central axis at an angle in the range of 30° to 90°.

53. A method as claimed in any of Claims 47 to 51 characterised in that the distal portion of the guide wire is formed from a material for retaining the distal portion in the curved configuration formed by the bend.
- 5
54. A method as claimed in any of Claims 47 to 52 characterised in that the distal portion of the guide wire is formed of dimensions for retaining the distal portion in the curved configuration formed by the bend.
- 10
55. A method as claimed in any of Claims 47 to 54 characterised in that the distal portion of the guide wire is bendable in the central minor plane thereof for facilitating bending of the distal portion with at least a part of the alignment portion bent out of the central major plane for facilitating guiding of the guide wire into a branched vessel of the subject.
- 15
56. A method as claimed in Claim 55 characterised in that the distal portion of the guide wire is formed from a material for facilitating manual bending of the distal portion in the central minor plane thereof.
- 20
57. A method as claimed in Claim 55 or 56 characterised in that the distal portion of the guide wire is formed of dimensions which facilitate manual bending of the distal portion in the central minor plane thereof.
- 25
58. A method as claimed in any of Claims 47 to 57 characterised in that the distal portion of the guide wire is formed from stainless steel material.
59. A method as claimed in any of Claims 47 to 58 characterised in that the distal portion of the guide wire is formed with the major surfaces thereof converging towards the distal end.
- 30
60. A method as claimed in any of Claims 47 to 59 characterised in that the distal portion of the guide wire is formed with the minor surfaces thereof diverging towards

the distal end.

61. A method as claimed in any of Claims 47 to 60 characterised in that a reinforcing means is provided on the distal portion of the guide wire for minimising
5 bending of the distal portion in the central minor plane thereof.

62. A method as claimed in Claim 61 characterised in that the reinforcing means is provided for extending along at least a portion of the distal portion of the guide wire from a proximal end of the distal portion.

10

63. A method as claimed in Claim 61 or 62 characterised in that the reinforcing means is provided for extending along at least a part of the alignment portion.

64. A method as claimed in any of Claims 61 to 63 characterised in that the
15 reinforcing means is provided to terminate at a location spaced apart from the distal end of the alignment portion.

65. A method as claimed in any of Claims 61 to 64 characterised in that the reinforcing means is located to coincide substantially with the central minor plane
20 defined by the distal portion.

66. A method as claimed in any of Claims 61 to 65 characterised in that the reinforcing means is provided by an elongated reinforcing member extending along one of the major surfaces of the distal portion.

25

67. A method as claimed in any of Claims 47 to 66 characterised in that the guide wire is formed with an elongated core wire extending from the proximal end to the distal portion.

30 68. A method as claimed in Claim 67 characterised in that the distal portion of the guide wire is integrally formed with the core wire.

69. A method as claimed in Claim 67 or 68 characterised in that the distal portion of the guide wire is formed from the core wire.

70. A method as claimed in Claim 67 characterised in that the distal portion of
5 the guide wire is formed separately from the core wire, and is secured thereto.

71. A method as claimed in any of Claims 67 to 70 characterised in that the distal portion of the guide wire is terminated in a bulbous portion at the distal end of the guide wire for facilitating guiding of the guide wire through vessels of the subject
10 without damaging vessels.

72. A method as claimed in Claim 71 characterised in that the bulbous portion is radiused.

15 73. A method as claimed in Claim 71 or 72 characterised in that the bulbous portion of the guide wire defines the distal end of the guide wire and defines a spherical distal end.

74. A method as claimed in any of Claims 71 to 73 characterised in that a sleeve
20 is provided extending from the bulbous portion in a proximal direction along the guide wire, and the core wire extends through the sleeve.

75. A method as claimed in Claim 74 characterised in that the sleeve terminates at a location intermediate the distal portion and the proximal end of the guide wire.